

# June Standards Summary Session

June 22, 2023

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## Standards Overview

- Working groups are made up of volunteers from the industry who share their technical knowledge and expertise to write documents on controlling static electricity in the manufacturing process or testing device sensitivities.
- Meet face-to-face three times a year – March/June/September
- Everyone is welcome and encouraged to participate.
- For a complete overview of the standards business unit structure and document development process, please visit <https://www.esda.org/standards/standards-working-groups/#references> > Standards Development Presentation or scan the QR code.



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## CONFIDENTIALITY POLICY

Applicable to Committee Members, Guests & Visitors

- All committee members, guests, and visitors to EOS/ESD Association, Inc. Standards-related meetings must adhere to the Confidentiality Policy.
- Work-in-Process (WIP) documents are distributed to committee members only.
- Document development material is considered confidential and shall not be disseminated to any other standards development organization.
- Any standards committee or working group member who violates this policy will be removed as a member. If this policy is violated by a guest or visitor, that individual will be barred from attending future standards meetings.

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## ANTITRUST POLICY – Slide 1 of 2

The penalties for violating antitrust laws are severe, including fines and even imprisonment of individuals found guilty of illegal conduct. Contrary to the belief that the government has relaxed antitrust enforcement, the Justice Department has recommended jail sentences for the majority of persons convicted of violating antitrust laws. Moreover, the U.S. Supreme Court has ruled that a trade association may be held legally responsible for the unauthorized, as well as authorized, acts of its members. Accordingly, every effort must be made to avoid even the appearance of impropriety.

The most common violations of antitrust laws are agreements among competitors to fix prices, allocate customers, or share confidential company information. As for the EOS/ESD Association, Inc., the most important thing to keep in mind is that its purpose is to “advance the theory and practice of Electrostatic Discharge (ESD) avoidance”. This is accomplished through publishing Standards, holding technical conferences and training, and providing certification programs. Accordingly, it is not the business of EOS/ESD Association, Inc. to consider or discuss matters relating to product development, marketing, purchasing, pricing decisions, or confidential company information.

It is the responsibility of each participant attending an EOS/ESD Association, Inc sponsored event or meeting of any kind, to avoid raising improper subjects for discussion. This reminder constitutes your awareness of these obligations.

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## ANTITRUST POLICY – Slide 2 of 2

### Antitrust Laws as related to EOS/ESD Association, Inc.:

- Do not preclude discussions on topics that are pertinent to the business of the EOS/ESD Association, Inc.
- Avoid the misuse of the standard development process in order to gain an unfair competitive advantage.
- Do not allow for improper conduct or conversations during any events or meetings.
- Restricts what can be divulged
- Restricts some actions of EOS/ESD Association, Inc., such as conspiring to capture market share
- Allows for activities that have a “pro-competitive” or positive effect

### Discussions to Avoid:

- License Terms, price, or pricing policy of your individual company
- Direct or indirect sales, quotas, market share
- Identified individual company statistics, inventories
- Particular competitors or customers
- Commercial Liabilities, warranties, or guarantees
- Anything dealing with “arm twisting”, excluding or controlling competition
- Any discussions related to trade secrets and confidential company information

## Current ESDA Patent Policy – Slide 1 of 2

### ANNEX A (NORMATIVE): EOS/ESD ASSOCIATION, INC. PATENT POLICY

#### A.1 EOS/ESD Association Patent Policy - Inclusion of Patents in EOS/ESD Association, Inc. Standards

There is no objection in principle to drafting an EOS/ESD Association, Inc. standard in terms that include the use of an essential patent claim (one whose use would be required for compliance with that standard) if it is considered that technical reasons justify this approach.

Participants in the ESDA/ANSI standards development process are encouraged to bring patents with claims believed to be essential to the attention of EOS/ESD Association, Inc.

If EOS/ESD Association, Inc. receives a notice that a proposed, revised, or approved standard may require the use of such a patent claim that is not already covered by the existing assurance, the procedures in this clause shall be followed.

#### A1.1 Statement from the patent holder

EOS/ESD Association, Inc. shall receive from the patent holder, or a party authorized to make assurances on its behalf, in written or electronic form, either:

- a) assurance in the form of a general disclaimer to the effect that such party does not hold and does not currently intend to hold any essential patent claim(s); or
- b) assurance that a license to such essential patent claim(s) will be made available to applicants desiring to utilize the license for the purpose of implementing the standard without compensation and under reasonable terms and conditions that are demonstrably free of any unfair discrimination.

Such assurance shall indicate that the patent holder (or third party authorized to make assurances on its behalf) will include in any documents transferring ownership of patents subject to the assurance, provisions sufficient to ensure that the commitments in the assurance are binding on the transferee and that the transferee will similarly include appropriate provisions in the event of future transfers with the goal of binding each successor-in-interest.

The assurance shall also indicate that it is intended to be binding on successors-in-interest regardless of whether such provisions are included in the relevant transfer documents.

## Current ESDA Patent Policy – Slide 2 of 2

### A1.2 Record of statement

A record of the patent holder's statement shall be retained in the files of EOS/ESD Association, Inc. and shall be made publicly available (at EOS/ESD Association's election, either on EOS/ESD Association, Inc.'s website or ANSI's LOA repository).

### A1.3 Notice

When EOS/ESD Association, Inc. receives from a patent holder the assurance set forth in A.1.1.b above, the standard shall include a note substantially as follows:

NOTE – The user's attention is called to the possibility that compliance with this standard may require the use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

### A1.4 Responsibility for identifying patents

Neither EOS/ESD Association, Inc. nor ANSI is responsible for identifying patents for which a license may be required by an EOS/ESD Association, Inc. standard or for conducting inquiries into the legal validity or scope of those patents that are brought to the Association's attention.

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Can download a copy of all three policies from [www.esda.org](http://www.esda.org) > Committees > Standards Working Groups.

Send questions to [standards.eosesda@esda.org](mailto:standards.eosesda@esda.org).

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## WG 1 – Wrist Straps

- Currently published documents:
  - ANSI-ESD S1.1-2021, “Wrist Straps”
  - ESD TR1.0-01-01, “Survey of Constant (Continuous) Monitors for Wrist Straps”
  
- Current Top 3 WG activities
  - Working on technical content updates (methodologies, measurement methods) of ESD TR1.0-01-2X “Survey of Constant (Continuous) Monitors for Wrist Straps”

## WG 1 – Wrist Straps Cont.

- In the most recent WG meeting:
  - Reviewed ESD TR1.0-01-2X “Survey of Constant (Continuous) Monitors for Wrist Straps” and discussed the status and contents of the document.
  - Main changes requested include:
    - Combine sections on different continuous monitors.
    - Add subsections on technologies (method) of constant monitors and pros and cons.
    - Add a more detailed description of the procedure to verify grounding and alarming.
    - Address grounding requirements of continuous monitors and monitoring of grounding.
  - Discussed inclusion of “dual-wire wrist straps” in a future revision of ANSI/ESD S1.1
    - Currently not addressed in a document other than ESD TR1.0-01-01.

## WG 2 – Garments

- Currently published documents:
  - ANSI-ESD STM2.1-2018, “Garments – Resistive Characterization”
  - ESD TR2.0-01-01, “Consideration for Developing ESD Garment Specifications”
  - ESD TR2.0-01-02, “Static Electricity Hazards of Triboelectrically Charged Garments”
  
- Current Top 3 WG activities
  - 5-year review of the standard test method ANSI/ESD STM2.1 “Garments – Resistive Characterization
  - Review and update the garment section of ESD TR20.20

## WG 2 – Garments Cont.

- In the most recent WG meeting:
  - Started the 5-year review of standard test method ANSI/ESD STM2.1 “Garments – Resistive Characterization”.
    - Several concerns have been raised and discussed, including:
      - Use of “periodic verification” and “compliance verification” in a qualification document
      - Photos of test set-ups show test leads contacting the garments.
      - Use of garments with and without cuffs.
    - Document requires significant revisions.
  - Completed the review and update of the garments section in ESD TR20.20. The main discussion points include the following:
    - Use of garments with and without cuffs.
    - Distinguished use of ESD Category 1 garments and ESD Category 2 and 3 garments
    - Application of test methods

## WG 3 - Ionization

- Currently published documents
  - ANSI/ESD STM3.1-2015 - Ionization
  - ANSI/ESD SP3.3-2016 – Periodic Verification of Air Ionizers
  - ANSI/ESD SP3.4-2016 – Periodic Verification of Air Ionizers Using a Small Test Fixture
  - ANSI/ESD SP3.5-2020 – Air Assist Bar Ionizers, Soft X-Ray (Photon) Ionizers, Room Ionization Alternatives, and Non-Airflow Alpha Ionizers
  - ESD TR3.0-01-02 - Alternate Techniques for Measuring Ionizer Offset Voltage and Discharge Time
  - ESD TR3.0-02-05 - Selection and Acceptance of Air Ionizers
  
- Current Top 3 WG activities
  - Five-year review of ANSI/ESD STM3.1-2015
  - Five-year review of ANSI/ESD SP3.3-2016
  - Five-year review of ANSI/ESD SP3.4-2016

## WG 3 - Ionization Cont.

- In the most recent WG meeting:
  - Discussion on revisions to ANSI/ESD STM3.1-2015 during the five-year review.
    - Section 4.2.2 - Addressed Alpha license statement with guidance from NRD representatives.
    - Removed unnecessary notes from Figures 1 and 2.
    - Addressed all should vs. shall statements – except for reporting requirements.
    - Reporting needs to be addressed throughout the entire document.
    - Lengthy discussion on reporting requirements for offset voltage.

## WG 4 – Worksurfaces

- Currently published documents
  - ANSI/ESD STM4.1-2017 - Worksurface – Resistance Measurements
  - ESD TR4.0-01-02 - Survey of Worksurfaces and Grounding Mechanisms
  
- Current Top 3 WG activities
  - Working a new technical report for resistance measurements of conveyors.
  - Five-year review of ANSI/ESD STM4.1-2017.

## WG 4- Worksurfaces Cont.

- In the most recent WG meeting:
  - Continue to work on the new conveyors technical report.

This technical report provides test methods for evaluating conveyors where protection of ESD susceptible items (ESDS) is required. It establishes methods for resistance measurements of conveyors transporting products where protection of ESDS is required.

Conveyors are used for moving products through the process and are also being used as a worksurface. Some different types of conveyors that are used and will be included in this document are thin belts; roller (wheel and cylinders) ball table; belt (flexible – layer and plastic); metal mesh; and chain. The document will cover the types of grounding for the conveyors, resistance measurement, and the frequency of testing.



## WG 5.0 – Device Testing

- Currently published documents
  - ANSI/ESD SP5.0-2018 - Reporting ESD Withstand Levels on Datasheets
- Current Top 3 WG activities
  - Five-year review of ANSI/ESD SP5.0-2018
  - Brainstorming
  - Open forum for new discussions

## WG 5.0 – Device Testing

- In the most recent WG meeting:
  - HBM and CDM stress on the same units for qualification.
    - Question came from ANSI/ESDA/JEDEC JS-002 industry review.
    - Is there a strong argument against HBM & CDM stress on the same units to pass both qualification requirements?
    - General consensus that latch-up should not be included.
  - HV Testing on Datasheet
    - Many datasheets report HBM levels for a select group of pins at high HBM levels (5 kV and greater)
      - This HBM testing uses the JS-001 waveform, but stress combinations are not aligned with the JS-001 method.
      - HV HBM stress is done in many ways:
        - All NS pins to GND only.
        - All NS pins to VDD and GND.
        - All NS pins to VDD, GND, and all ganged.
        - NS, VDD, GND pin to the JS-001 method (a.k.a. subset of pins treated like a full device).

## WG 5.0 - Subject Matter Cont.

- In the most recent WG meeting cont.:
  - ESD field failure
    - Product described in a 2011 Symposium paper
    - HBM and CDM are not able to replicate the damage signature
    - Charged Board Event – was able to replicate the damage
    - Charged Cup – was able to replicate the damage
    - Should other stress methods be investigated—should a technical report be published on these times of failures?

## JWG HBM

- Currently published documents
  - ANSI/ESDA/JEDEC JS-001-2023 - Human Body Model (HBM) – Device Level
  - ANSI/ESD SP5.1.3-2022 - Human Body Model (HBM) – A Method for Randomly Selecting Pin Pairs
  - ESD JTR001-01-12 - User Guide of ANSI/ESDA/JEDEC JS-001 Human Body Model Testing of Integrated Circuits
- Current Top 3 WG activities
  - Limited ballot update of ANSI/ESDA/JEDEC JS001
  - Complete revision of ESD JTR001-01-12
  - Five-year review of ANSI/ESD SP5.1.3

## JWG HBM Cont.

- In the most recent WG meeting:
  - Continued development of new document ESD SP5.1.4 - A Method for Random Sampling of Power Pins
    - The document proposes a methodology to reduce test time for two-channel testers keeping the same ANSI/ESDA/JEDEC JS-001 test coverage. It defines how to randomly select power pins to be tied to terminal B ensuring at the same time all of the pins will be stressed at least once.
  - Cloned IO
    - The methodology is not widely used, and there are examples where it does not work. Discussion on this part of the standard to be done in the next meeting. Options include:
      - Keep and improve the section
      - Remove the section
      - Move the section to a new standard practice
  - User guide
    - Done most of the writing, but sections still need to be consolidated and harmonized

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## JWG HBM Cont.

- In the most recent WG meeting cont.:
  - ESDA roadmap
    - Additional bullet to highlight two-channel usage benefits
    - More focus is needed on the User Guide
  - Continuity
    - No requirement in the document (in NOTE for relays and shall for two-channel tester)
    - Proposal for next limited ballot to better specify
- Future topics to be considered:
  - IO vs. IO testing with a 2-channel tester
    - If coupled IO info is not known, test each IO vs. all other single IOs (Table B)
  - Adding reference to user guide in ANSI/ESDA/JEDEC JS-001
  - Additions to User guide
    - How to report tester testing (delay between zaps, pin/polarity partitioning, ...)
    - Section on true random sampling, as called out in ANSI/ESD SP5.1.3
    - Section on power sampling, as called out in ESD SP5.1.4
    - Curve tracing and continuity section

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## JWG CDM

- Currently published documents
  - ANSI/ESDA/JEDEC JS-002-2022 - Charged Device Model (CDM) - Device Level
  - ESDA/JEDEC JTR002-01-22 - User Guide of ANSI/ESDA/JEDEC JS-002 – Charged Device Model Testing of Integrated Circuits
  - ANSI/ESD SP5.3.3 – Charged Device Model (CDM) - Component Level – Low Impedance Contact CDM as an Alternative CDM Characterization Method
  - ANSI/ESD SP5.3.4-2022 - Charged Device Model (CDM) Testing – Component Level – Capacitively Coupled – Transmission Line Pulsing as an Alternative CDM Characterization Method
- Current Top 3 WG activities
  - Limited ballot changes to ANSI/ESDA/JEDEC JS-002 removing 1 GHz oscilloscope information and requiring the use of high bandwidth ( $\geq 6$  GHz) oscilloscopes.
  - Creating a Bare Die CDM technical report detailing issues with determining the CDM robustness of Bare IC die.
  - Defining the scope of upcoming multi-site data gathering comparing LICCDM and Field-Induced CDM to support successful Round Robin needed to include LICCDM method/procedure/waveform limits within ANSI/ESDA/JEDEC JS-002.

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## JWG CDM Cont.

- In the most recent WG meeting:
  - Reviewed first drafts of Limited Ballot writing team changes for both ANSI/ESDA/JEDEC JS-002-2022 and JTR002 documents, primarily removing 1 GHz oscilloscope information from both.
  - Reviewed draft status of the Bare Die CDM technical report and next draft steps.
  - Review/discussions of separate topics (1-zap vs. 3-zap CDM data/justification and LICCDM/ANSI/ESDA/JEDEC JS-002 round robin scope).

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## WG 5.5 – Transmission Line Pulsing

- Currently published documents
  - ANSI/ESD STM5.5.1-2022 - Transmission Line Pulse (TLP) - Component Level
  - ESD TR5.5-01-08 - Transmission Line Pulse (TLP)
  - ESD TR5.5-02-08 - Transmission Line Pulse Round Robin
  - ESD TR5.5-03-14 – Very-Fast Transmission Line Pulse Round Robin
  - ESD TR5.5-04-22 – Transmission Line Pulse (TLP) – User and Application Guide
  - ESD TR5.5-05-20 – Transmission Line Pulse (TLP) – Transient Response Evaluation
  
- Current Top 3 WG activities
  - Write a standard practice on transient analysis with VF-TLP
  - Started to compile a technical report to summarize what can be done today with (VF-)TLP for statistical measurements and identify bottlenecks
  - A continuous activity is extending the User and Application Guide when needed.

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## WG 5.5 – Transmission Line Pulsing, User Guide

- New section 2.11 describes effects of oscilloscope bandwidth and sample rate limitations
- The WG adjudicated TAS review comments
  - 18 suggestions were followed, 2 were not followed

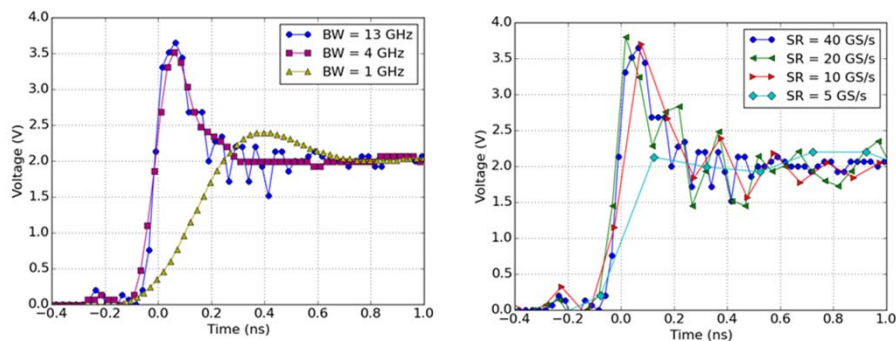


Figure 37: Voltage Waveforms of the Measurements of Figure 36 at 6.5 Amperes  
 (a) Different Bandwidths, Sample Rate = 40 GS/s; (b) Different Sample Rates, Bandwidth = 13 GHz.

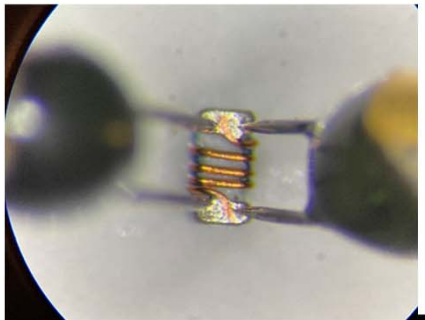
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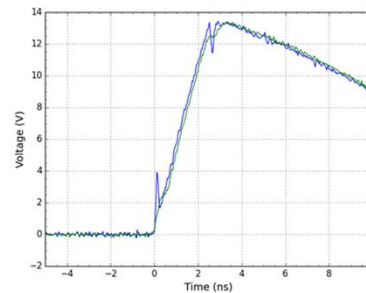
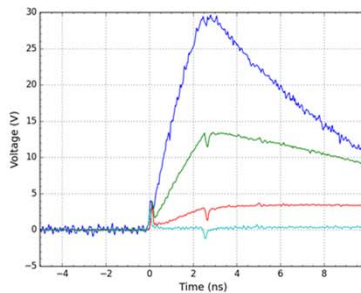
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## WG 5.5 – Transmission Line Pulsing, Transient Response

- Discussed first data from Theo Smedes for Robert Ashton's idea to use capacitors and inductors as calibration structures for transient analysis
- Initial results are promising and give guidance for suitable L and C values and indicate pitfalls, e.g for capacitors
  - $C \approx 1$  nF gives reasonable voltages/currents
  - rise time  $\geq 300$  ps does not show inductive spike



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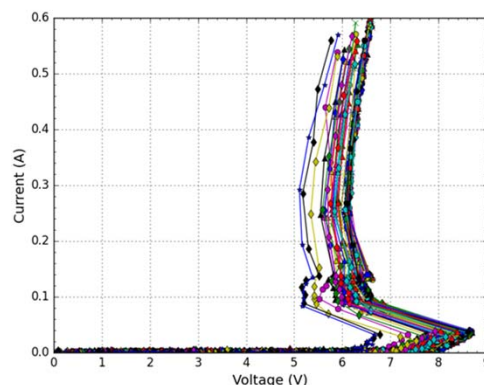


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## WG 5.5 – Transmission Line Pulsing, Statistical Usage

- Presentation with some data sets illustrating potential problems
- Measurement is not the issue, automated TLP set-up very useful
- Main challenges are automated parameter extraction and filtering out incorrect data
- Example:
  - Set of curves in figure
  - What is the cause of the variation?
- The work has just started
- Target is to have a first version within 1 year
- Help is welcome!



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## WG 5.6 – Human Metal Model

- Currently published documents:
  - ESD SP5.6-2019 - Human Metal Model (HMM) - Component Level
  
- Current Top 3 WG activities:
  - Work on ESD TR5.6-01-2x
  - It summarizes the knowledge collected in WG 5.6 throughout the years, including a summary of all round-robin/testing carried out.

## WG 5.6 - Human Metal Model Cont.

- In the most recent WG meeting:
  - Next virtual meeting is July 11 at 10 AM, EST
  - Currently working on the TR document
    - Several sections need input, including:
      - ESD gun dependencies on voltage, geometry, first pulse, etc.
      - Test fixtures
      - HMM Pulse Sources
    - No further experiments are currently planned.
    - It is the intention that WG 5.6 goes dormant after the TR has been published.

## WG 7 - Flooring

- Currently published documents
  - ANSI/ESD STM7.1-2020 – Floor Materials – Characterization of Materials
  - ESD TR7.0-01-23 – Static Protective Floor Materials
  
- Current Top 3 WG activities
  - Working on a flooring systems training module

## WG 7 – Flooring Cont.

- In the most recent WG meeting:
  - The group reviewed a draft of the training module and came to an agreement on how to complete the draft. Targeting a 1.5 to 2 hour tutorial.



## WG 11 - Packaging

- Currently published documents
  - ANSI/ESD STM11.11-2022 - Surface Resistance Measurement of Planar Materials
  - ANSI/ESD STM11.12-2021 - Volume Resistance Measurement of Planar Materials
  - ANSI/ESD STM11.13-2021 - Two-Point Resistance Measurement
  - ANSI/ESD STM11.31-2018 - Bags
  - ANSI/ESD S11.4-2022 - Static Control Bags
  - ANSI/ESD S541-2019 - Packaging Materials
- Current Top 3 WG activities
  - Task Teams
    - Box Shielding
    - Incline Plane
    - Low Charging

## WG 11 – Packaging Cont.

- In the most recent WG meeting:
  - Box Shielding – Data received from 7 of 13 labs was reviewed
  - Incline Plane – Reviewed data from 1 Lab. Time was spent discussing this test.
  - Low Charging – Discussion on Low Charging in Table 1 of ANSI/ESD S541 being Required electric Charge Accumulation Testing.
  - ANSI/ESD STM11.31 – Waveform to be added to the Annex. The waveform is important as it shows the continuity of the material layer is intact at the fold (bull nose) of the bags. This will be a Normative annex.

## WG 13 – Handtools

- Currently published documents:
  - ANSI/ESD S13.1-2019 - Electrical Soldering/Desoldering Hand Tools
  - ESD TR13.0-01-99 - EOS Safe Soldering Iron Requirements
  
- Current Top 3 WG activities
  - Continued work on technical contents (measurement methods) of Technical Report TR13.1-02-2X “Resistance Measurements of Hand Tools”
  - Started 5-year review of ANSI/ESD S13.1-2019

## WG 13 – Handtools Cont.

- In the most recent WG meeting:
  - WG discussed status and contents of Technical Report TR13.1-02-2X “Resistance Measurements of Hand Tools”, main outcome:
    - Two resistance measurements are required to fully characterize risk of handtools, will be included in TR:
      - Resistance point to point of tip of tool (addresses CDM risk and isolated conductor)
      - System resistance from tip of tool through grip with personnel to ground in case the tip is conductive (addresses IEC 61000-4-2 discharge scenario)
    - Examples with photos for both test methods and preferably also data will be included in TR
    - Next steps: Update outline of document and ask for contributions, re-write Foreword, Purpose, ...
  - Discussion started on possible changes of ANSI/ESD S13.1 “Electrical Soldering/Desoldering Hand Tools” (5-year review); no obvious major changes identified.

## WG 14 – System Level ESD

- Currently published documents
  - ESD TR14.01-00 - Calculation of Uncertainty Associated With Measurement of Electrostatic Discharge (ESD) Current
  - ESD TR14.02-13 - System Level Electrostatic Discharge (ESD) Simulator Verification (Formally ANSI/ESD SP14.1)
  - ANSI/ESD SP14.5 - Near Field Immunity Scanning -Component/Module/PCB Level (EMC/ESD Scanning)
  
- Current Top 3 WG (Working Group) activities
  - Discussion on a proposed Direct Pin Direction test, similar to IEC61000-4-2
  - Discussion on CDE (Charged Device Event) test method development
  - Discussion on a Burst test method IEC 61000-4-4 and whether it may be suitable for this WG to address it's use on device level testing?

## WG 14 – System Level ESD

- In the most recent WG meeting:
  - Focused on a proposed Direct Pin Injection test method
    - Although the IEC61000-4-2 standard states that this method should not be used directly on connector pins, device manufacturers are being asked to provide test levels on external connection pins
    - Discussing Direction Pin Injection testing, brings up the question as to whether CDE (Cable Discharge Event) are simply just another stimulus type of Direct Pin Injection testing?
      - Should we continue the development of a CDE document?
  - Burst test method IEC 61000-4-4
    - A question was raised to the TLP WG, as to whether TLP could be used to perform this test?
      - Due to the repetition rates, this is not feasible using a TLP system
    - Several questions were raised which need to be posed to the original submitter to determine whether this test method could be covered by this WG
      - Are you looking to use this as another Direct Pin Injection stimulus?
      - Are you trying to reproduce real world failures?

## WG 15 - Gloves

- Currently published documents
  - ANSI/ESD STM15.1-2019 - Methods for Resistance Measurement of Gloves and Finger Cots
- Current Top 3 WG activities
  - Discussion on using two Cylinder Electrodes for Compliance Verification within the EPA.
    - Measure operators wearing gloves using 2 stainless steel cylinders
    - Measures both types of gloves that are conductive or static dissipative.
    - Method is not a replacement when a wriststrap is worn on one hand and the other hand holds the stainless steel cylinder.
  - Moving forward on breakdown voltage for ESD safe gloves.
  - Discussion on establishing limits using ANSI/ESD STM15.1.
    - Discussion on defining different guideline recommendations with various glove types.
    - Decided to conduct a survey with predetermined questions to end users and glove suppliers to address "Why is there no glove resistance limits in ANSI/ESD S20.20?"

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## WG 17 – Process Assessment

- Currently published documents:
  - ANSI/ESD SP17.1-2020 - Process Assessment Techniques
  - ANSI/ESD SP10.1-2016 - Automated Handling Equipment (AHE)
  - ESD TR17.0-01-15 - For ESD Process Assessment Methodologies in Electronic Production Lines – Best Practices Used in Industry
- Current Top 3 WG activities
  - Completion of ANSI/ESD SP17.1 Rev. 2 after IEC TC101 meeting (July 3-6, 2023)
  - Start working on new document (TR). Focus: Application of flow and methods of ANSI/ESD SP17.1 to process steps with die-to-die interfaces. Experts outside WG17 will be invited to support.
  - Task teams and Writing Teams continue work on introductory slide set on ANSI/ESD SP17.1, on ANSI/ESD SP17.2 ("Process Assessment of Electrical Disturbances"), and Technical Report on ESD event detection

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## WG 17 – Process Assessment Cont.

- In the most recent WG meeting:
  - Status ANSI/ESD SP17.1 Rev. 2:
    - Parking lot items from ESDA reviews (TAS, STDCOM, industry review) addresses in included in new version; change requests from IEC TC101 review of 1<sup>st</sup> Committee Draft (CD) discussed and approved / rejected.
    - Final discussion of changes will be postponed to September after IEC TC101 meeting and discussion of comments on 2<sup>nd</sup> CD (July 3-6, 2023).
  - White Paper II of Industry Council will address processes with die-to-die interfaces with very low CDM robustness (down to 5 V).
    - Industry desires a ESD control program for such processes, however, not possibly as tools and processes differ significantly.
    - Request to WG to develop a document applying ANSI/ESD SP17.1 to typical process steps with die-to-die interfaces. Experts from outside the WG required.
  - Presentation by Henry Wolf (Fraunhofer, Munich/Germany) on CDM discharge measurements in process equipment is very beneficial for ANSI/ESD SP17.1 assessment flows and work should be continued.

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## WG 18 - EDA Tool Working Group

- Currently published documents
  - ESD TR18.0-01-14 – ESD Electronic Design Automation (EDA) Checks
  - ESD TR18.0-02-20 – Latch-up Electronic Design Automation (EDA) Checks
- Current Top 3 WG activities
  - New revision of ESD TR18.0-01 on ESD EDA
  - ESD EDA Workshop at 2023 EOS/ESD Symposium
  - EDA section of ESD Roadmap

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## WG 18 - EDA Tool Working Group - Cont.

- In the most recent WG meeting:
  - ESD EDA TR:
    - Chapter 3 (flows) still needs to be revised to address open questions/comments and reconcile new information moved from other chapters. Discussing the new flow table and how it should reflect all categories of tools described in the document, including system-level specific SEED, Full Wave Analysis, and Near Field Scanning tools.
    - Chapter 4 (schematics-based/topological checks) is being edited.
    - Chapter 5 (layout-based DRC/CD/P2P/LDL checks) needs to be enhanced with DRC introductory info. Flow figure needs to be updated to reflect added DRC scope. Tables in Appendix A need to be updated to reference chapter content as well.
    - Chapters 6 (package checks), 7 (system level), 8 (SPICE) and 9 (TCAD) need to be synchronized with the Appendix A tables. Additional chapter alignment may be needed based on the discussion at the meeting related to Flow table.
    - Appendix A is being restructured based on the meeting discussion. Most of the existing Appendix A content (detailed rule description) except for sections introduction and reference tables has been moved into backup (at the end of TR). This information is going to be excluded from this final TR, but will consider publishing it as separate user guide(s), e.g., topological checks user guide, layout-based checks user guide, etc. User guides will be worked on after the main TR is published.

## WG 18 - EDA Tool Working Group - Cont.

- In the most recent WG meeting cont.:
  - 2023 ESDA EDA Activities:
    - The next revision of ESDA technology roadmap will include EDA paragraph/section.
    - 2023 ESD Symposium EDA workshop (October 2023) - "ESD EDA: What Can be Done Now and in the Future?" Table leaders (sub-chairs) will represent different TR chapters.

## WG 20 – ESD Control

- ANSI/ESD S20.20–2021 - Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
- ESD TR20.20-2016 - ESD Handbook
  
- Review chapters for ESD TR20.20 and update per newest release of ANSI/ESD S20.20-2021.
  - This is the handbook for ESD control programs that support ANSI/ESD S20.20

## WG # - Subject Matter Cont.

- In the most recent WG meeting:
  - Review of submitted chapters for ESD TR20.20
    - Gloves
    - Wrist Straps

## WG 22 - Subject Matter

- Currently published documents
  - ESD TR22.0-01-14 – Relevant ESD Parameters for Seamless ESD Design and Verification Flow
  - ESD TR22.0-02-18 – Relevant ESD Parameters for Seamless ESD Design and Verification Flow – Part 2 – ESD Parameters from Intellectual Property (IP) Providers)
  
- Current Top 3 WG activities
  - Update of ESD TR22-01

## WG 25 – (CBE) Charged Board Event

- Currently published documents
  - ESD TR25.0-01-16 - Charged Board Event (CBE)
  
- Current Top 3 WG activities
  - TR25.0-02-23 Charged Board Event (CBE) Characterization Methods for Electronic Assemblies
    - WG is finalizing the adjudication of comments
    - Target to release by the end of the year



## WG 25 – (CBE) Charged Board Event

- In the most recent WG meeting:
  - Review and adjudicated the TAS comments on ESD TR25.0-02-23
    - Many comments were agreed upon and changes made
    - Others were discussed in the WG and updates made to the document

## WG 26 – System Model ESD

- Currently published documents
  - None
  
- Current Top 3 WG activities
  - ESD TR26.01: Approval for publication pending
  - ESD TR26.02: in review process
  - Gather data for TR26.02 revised document
    - Measurement data for simulation input
  - Planning and doing simulations
    - Components
    - System

## WG 26 – System Model ESD Cont.

- In the most recent WG meeting:
  - Status of documents
  - Presentation of measurements of CAN application
  - Planning of next steps

## WG 27 – Automotive EOS

- Currently published documents
  - ANSI/ESD SP27.1-2018 – Recommended Information Flow Regarding Potential EOS Issues between Automotive OEM, Tier 1, and Semiconductor Manufacturers
  
- Current Top 3 WG activities
  - ESD TR27.0-01 – Addressing TAS high-level review
  - ANSI/ESD SP27.1 – Beginning 5-year review

## WG 27 – Automotive EOS Cont.

- In the most recent WG meeting:
  - ESD TR27.0-01
    - High-level overview of the document and history of activities
    - TAS guidance in the document is going in the right direction, however, it requires a lot of work/refinement prior to the next TAS review.
    - Need support from Tier 1 supply chain organizations (electronics manufacturers).

## WG 28 – Electrostatic Attraction

- Currently published documents
  - Nothing has been published so far
- Current Top 3 WG activities
  - Currently working on a technical report to give guidance to industry on the mechanisms, issues and common techniques used to mitigate electrostatic attraction of contamination. Current industries with specific issues addressed are:
    - Medical device/life science
    - Aerospace & military
    - Fiber optics
    - Semiconductor and wafer fabrication
    - Other general manufacturing operations

## WG 28 – Electrostatic Attraction Cont.

- In the most recent WG meeting:
  - The working group continued editing the draft of the technical report based on feedback from two members of the committee and TAS.
  - Key items were:
    - Re-writing the purpose to more clearly identify a said purpose
    - Develop a table of mitigation strategies as a summary of the document
    - Ensured correct application of the terms “FOD, FOD, FO, FM, etc. in the Aerospace & Military section.
  - Assigned development of drawings to obtain better quality figures to three committee members.

## WG 29 - Healthcare

- Currently published documents
  - None
  
- Current Top 3 WG activities
  - Developing a new technical report - ESD TR29.0-01 - Guidance for Control of Electrostatic Hazards in Healthcare Facilities.

## WG 29 - Subject Matter Cont.

- In the most recent WG meeting:
  - WG29 continued the development of a new guidance document, ESD TR29.0-01 - Guidance for Control of Electrostatic Hazards in Healthcare Facilities.

## WG 97 – Footwear/Flooring

- Currently published documents
  - ANSI/ESD STM97.1–2015 - Footwear/Flooring System – Resistance Measurement in Combination with a Person
  - ANSI/ESD STM97.2–2016 Footwear/Flooring System – Voltage Measurement in Combination with a Person
- Current Top 3 WG activities
  - Five-year review and update of ANSI/ESD STM97.2
  - Five-year review and update of ANSI/ESD STM97.1

## WG 97- Footwear/Flooring Cont.

- In the most recent WG meeting:
  - Continued to review TAS comments on ESD WIP97.2
    - In some areas of the document, the formatting needs to be updated to be per the ESDA style manual.
  - Discussion on ESD WIP97.2 regarding equipment and cables.
    - A small task team was created to review concerns.